REMARKS/ARGUMENTS

Reconsideration and withdrawal of the rejections set forth in the Office Action dated 6 May 2003 are respectfully requested. The applicant petitions the Commissioner for a two-month extension of time; a separate petition accompanies this amendment.

I. Amendments

The present amendment amends claims 13, 16, and 17 and cancels claims 19-24, leaving claims 1-7, 9, 10, 13, 14, 16, and 17 pending in the application. In the Final Office Action mailed 6 May 2003, the Examiner withdrew claims 19-24 from consideration as being drawn to a non-elected invention. Although these claims have been canceled to place the application in condition for allowance, applicant reserves the right to pursue the subject matter of claims 19-24 in a continuing application.

II. Rejections under 35 U.S.C. § 112, second paragraph

The Examiner rejected claims 1-12 as indefinite under the second paragraph of 35 U.S.C. § 112. First, the undersigned would like to note that the amendment filed 22 January 2000 canceled claims 8, 11, and 12. Accordingly, the undersigned assumes that the present rejection would apply only to claims 1-7, 9, and 10. In support of this rejection, the Examiner points to the prior Office Action, which states:

> It is not possible to determine what the actual structure of the recited semiconductor workpiece *[sic]* holder is. By reciting that the composition of the material plated onto the contact face is related to the material which is to be plated onto the semiconductor *[sic]*, the structure is based on a process step which occurs at some time in the future. This limitation is indefinite.

(Page 2 of the Office Action mailed 3 October 2000.)

The undersigned respectfully submits that the present claims do meet the threshold requirements of 35 U.S.C. § 112, second paragraph. The MPEP explains that this statutory requirement is merely a threshold requirement for clarity and

precision, i.e., the mere fact that the .Examiner believes the claim can be phrased better does not render the claim indefinite:

> The examiner's focus during examination of claims for compliance with the requirement for definiteness of 35 U.S.C. 112, second paragraph is whether the claim meets the threshold requirements of clarity and precision, not whether more suitable language or modes of expression are available. When the examiner is satisfied that patentable subject matter is disclosed, and it is apparent to the examiner that the claims are directed to such patentable subject matter, he or she should allow claims which define the patent-able subject matter with a reasonable degree of particularity and distinctness.

MPEP § 2173.02 (emphasis in original).

The undersigned would also like to point out that defining aspects of a claim with reference to a variable object, e.g., the width of a car door, does not inherently render the claim indefinite. (MPEP § 2173.05.) When read in context, the undersigned respectfully submits that the present claim language is sufficiently definite to meet the threshold requirements of 35 U.S.C. § 112, second paragraph.

III. Rejections under 35 U.S.C. § 103

A. The Applied Art

The Examiner relies on combinations of several references in rejecting the claims. In particular, of the currently pending claims, the Examiner rejected claims 1-7, 13, and 14 as obvious over U.S. Patent No. 5,078,852 ("Yee") in view of selected excerpts from a book entitled *Electroplating* ("Lowenheim") and U.S. Patent No. 5,723,028 ("Poris"). The Examiner also rejected currently pending claims 9, 10, 16, and 17 as obvious over a string of four separate references, adding U.S. Patent No. 4,118,301 ("Mayer") to the mix.

Yee discloses a plating rack for use in electroplating a substrate, e.g., wafers. This plating rack includes a series of cam assemblies 16, each of which includes a cam 28 that engages a surface of the wafer. Yee specifically states that the cam must be made from a material which is different from the metal that is being electroplated on the

wafer. See, e.g., column 4, lines 16-20, which state, "[t]he cam **28** itself is a bistable, rotatable probe tip that can be easily removed and replaced. It is made from an inert material such as titanium so that electroplated metals such as copper can be etched back without attack of the cam." It is particularly interesting that Yee discusses electroplating copper and specifically dictates that, when depositing copper, the cam 28 should be formed of a material other than copper.

The Examiner relies on a few selected pages of Lowenheim to demonstrate a few basic points. First, different coatings have different purposes. Second, gold has a number of uses in the electronics industry. Third, gold is useful in semiconductors because it will not poison them. As currently understood, the Examiner relies on Poris simply as suggesting that copper, silver, and gold can be electroplated on semiconductor materials.

Mayer suggests an electrofinishing system for stainless steel cutlery and the like. As the Examiner notes, this stainless steel cutlery may be held in place during the electrofinishing process by a clip 68 that may include some copper. As shown in Figure 6 of Mayer, this copper is specifically a non-cold-worked sleeve 80, which corrodes much more slowly than the stainless steel that is being electrofinished.

B. Claims 1-4 Are Patentable Over the Applied Art

Claim 1 calls for an apparatus for use in electroplating a metal that is principally comprised of a metal X onto a wafer. This apparatus includes, among other things, at least one electrode having a contact face that is adapted to engage a surface of the wafer to conduct electrical current thereto. The surface of the wafer is engaged at a portion of the contact face that has been pre-coated with a metal layer that is principally comprised of the metal X.

In rejecting claim 1, the Examiner recites three disparate aspects of Yee, Lowenheim, and Poris, then contends that it would have been obvious to combine these three disparate properties to arrive at the presently-claimed invention. In particular, the Examiner relies on Yee as showing cams 28 that can be used to

electroplate; relies on Lowenheim as generally teaching that electroplated gold layers are applied to electrical devices; and points to Poris as showing the electroplating of gold. The examiner then supposes it would have been obvious to use a gold layer such as that taught by Poris to coat Yee's wafer **and** to electroplate Yee's cams with gold "because desirable properties such as improved electrical contact and avoidance of poisoning the semiconductor workpiece would have been obtained as taught by Lowenheim."

The undersigned respectfully submits that such hindsight speculation is an insufficient basis for an obviousness rejection. The MPEP states:

> To establish a *prima facie* case of obviousness three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. **The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure.**

(MPEP § 2142; emphasis added.) The MPEP also specifically warns that the "fact that the claimed invention is within the capabilities of one of ordinary skill in the art is not sufficient by itself to establish *prima facie* obviousness." (MPEP § 2143.01.)

In light of the above, the undersigned respectfully submits that the Examiner has not stated a *prima facie* basis for rejecting claims 1-4 under 35 U.S.C. §103. First, nothing in Yee, Lowenheim, or Poris suggests their combination in the manner the Examiner proposes. In the current instance, the Examiner is selecting isolated aspects of three different references to contend that the present invention would have been obvious. The only teaching that suggests such a particular combination is applicant's own disclosure. This is an improper basis for an obviousness rejection.

Second, the proposed modification of these references goes directly against the teachings of the primary reference, Yee. As noted above, Yee specifically states that

the cam 28 should be formed of an inert material, e.g., titanium, that will not be attacked during etching of an electroplated metal. Using gold cams 28 to apply a layer of gold on a wafer, as the Examiner suggests, would not meet this explicit requirement of Yee. Modifying a reference in a fashion that directly contradicts its teaching and impair its stated function simply is not obvious. Consequently, claim1 and dependent claims 2-4 are patentably distinguishable from the proposed combination of Yee, Lowenheim, and Poris on this basis, as well.

C. Claims 5-7 Are Patentable Over the Applied Art

Claim 5 of the present application calls for an apparatus for use in electroplating a metal onto a wafer that includes, among other elements, at least one electrode that has a contact face layer adapted to engage the surface of the wafer to conduct electrical current thereto. The contact face layer is made from a metal-containing contact face material that comprises the same principle metal that is to be plated onto the wafer.

The undersigned respectfully submits that many of the deficiencies noted above in the Examiner's proposed combination of references also apply to at least the identified aspects of claim 5. Claim 5, therefore, is patentable over the applied references. Claims 6 and 7 depend from claim 5 and are believed to be patentable at least by virtue of their dependence from an allowable base claim.

D. Claims 9 and 10 Are Patentable Over the Applied Art

Claim 9 recites a wafer holding assembly for use in electroplating apparatus used to plate copper onto a wafer. This assembly includes at least one electrode having a contact face that is adapted to engage a surface of the wafer to conduct electrical current thereto. The contact face is pre-conditioned prior to contacting the wafer by electroplating a copper-containing layer thereon using the copper-containing electrolyte. In support of this rejection, the Examiner relies on Yee, Lowenheim, and Poris for the same reasons discussed above. In addition, the Examiner points to the

use of a copper collar on a spoon clamp in Mayer's stainless steel electrofinishing system.

The undersigned fails to understand the Examiner's logic in this rejection. In rejecting claims 1-7, the Examiner suggested it would have been obvious to electroplate Yee's cams 28 with gold because Lowenheim suggests gold has some useful mechanical and electrical properties. Apparently, however, the Examiner is now suggesting contradicting at least the cited portions of Lowenheim, instead suggesting that the copper collar of Mayer may be used in Yee's device in some fashion.

To the extent that this rejection is understood, the undersigned submits that there is nothing in the references to suggest their combination as the Examiner proposes. If anything, Mayer echoes Yee's statement that the cam 28 (or clamp 68 in Mayer) be formed of a material that is different from the material that is to be treated. In Yee's case, the cam 28 is formed of titanium or other inert metal that will not be attacked during etching of the material electroplated using the cams. Mayer utilizes a non-cold-worked copper sleeve 80 specifically because it is better adapted to withstand the electrofinishing process that is used to electropolish and passivate stainless steel. If a stainless steel clip were used, for example, this clip would very quickly degrade when repeatedly subjected to the same attack that electrofinishes the cutlery in a single pass.

Hence, to the extent that the rejection of claim 9 is understood, the undersigned submits that it fails to state a *prima facie* § 103 rejection on at least two grounds. First, there is nothing in the references themselves to suggest their combination as the Examiner proposes. Second, the references themselves, namely Yee and Mayer, specifically teach away from the Examiner's proposed combination. Consequently, claim 9 and dependent claim 10 are believed to be patentable over any defensible combination of Yee, Lowenheim, Poris, and Mayer.

E. Claims 13 and 14 Are Patentable Over the Applied Art

Claim 13 recites a method for plating a metal onto the surface of a wafer. In accordance with method, a surface of the wafer is contacted with an electrode having a contact face that is covered by a contact face layer. A surface of the wafer is submersed into a plating bath and a metal is electroplated from the plating bath onto the surface of the wafer by passing electrical current between the wafer and the electrode through the contact face layer, which is formed from the same principal metal that is plated onto the wafer.

The Examiner relies on the same combination of Yee, Lowenheim, and Poris discussed above in connection with claim 1 to support the present rejection of claim 13 as obvious. The undersigned respectfully submits that this combination of references has the same basic defects vis-à-vis claim 13 as those outlined above. Consequently, claim 13 and dependent claim 14 are patentable over these references.

F. Claims 16 and 17 Are Patentable Over the Applied Art

Claim 16 calls for a method for plating copper onto the surface of a wafer. In accordance with this method, a surface of the wafer is contacted with an electrode at a contact face that is covered by a contact face layer. The contact face layer is formed from a metal that is principally comprised of copper. A surface of the wafer is submersed into a plating bath, which is used to plate a plating material that is principally comprised of copper onto the wafer. The plating material is electroplated onto the surface of the wafer by passing electrical current between the wafer and the electrode through the contact face layer.

In rejecting claims 16 and 17, the Examiner relies on the same four-way combination of Yee, Lowenheim, Poris, and Mayer that were discussed above in connection with the rejection of claim 9. Many of the deficiencies of the Examiner's proposed combination of these references are relevant to the rejection of claim 16, as well. As a consequence, the undersigned respectfully submits that claim 16 and dependent claim 17 are patentable over the proposed combination of references.

IV. Conclusion

In view of the foregoing, the claims pending in the application comply with the requirements of 35 U.S.C. § 112 and patentably define over the applied art. If the Examiner believes a telephone conference would expedite prosecution of this application, the Examiner is encouraged to call the undersigned at (206) 359-3848.

Respectfully submitted,

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